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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/543,185

03/23/2006

Norio Murase

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

03/12/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/543,185	Applicant(s) MURASE ET AL.	
	Examiner Matthew E. Hoban	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-9 and 13 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 10-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-9 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/22/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II in the reply filed on 12/12/2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). The claims 11-12 are not associated with Group II and thus are withdrawn from consideration as the invention of claims 11-12 represents a materially different invention from that of Group II. Furthermore, the invention of Group II is directed towards a product, where that of Group III is to a process of making. There are plural diverse ways of making the product of Group III namely the creation of such particles in-situ by including an Oxide, which is subsequently converted to a Sulfide through heat treatment in a sulfide gas phase. Finally, the two groups II and III do not include a special technical feature as required by PCT guidelines. No reasons as to why the restriction was improper have been submitted, so this requirement is deemed to be final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barney in 2002/0110180.

Regarding Claims 6: Barney teaches a temperature sensing composition that includes a matrix composition and semiconductor nanocrystals exhibiting fluorescence. It is stated that the quantum efficiency of the nanocrystals used can be greater than 20% and even greater than 80%. (see Paragraph 18). Barney goes on to state that the matrix in which the semiconductor nanocrystals are disposed can be an inorganic matrix

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such as a sol-gel derived matrix. (See paragraph 30). Barney then gives suitable precursors for such a matrix including hydrolysable compositions including silicon alkoxide (See Paragraph 32). In the claims it is noted that some language is drawn to product-by-process type limitations. These recitations are not limiting and do not offer patentable distinction in view of Barney, in that barney creates a sol-gel glass through a different precursor. Regardless, the final product is the same and is in the form of a sol-gel glass.

Regarding Claim 7: Barney shows suitable ratios between the nanocrystals and binder in paragraph 42. This ratio is stated as being 5:1 or 10:1. These ratios give suitable concentrations of nanoparticles to reach Barney's goal. Although, this specific example is given in light of silicone polymers, the concentration of the nanoparticles is seen as the major teaching of this statement. In other words, a matrix, with a concentration of nanoparticles in this range produces beneficial results. This teaching would also be applicable to the other embodiment of Barney's invention, where an inorganic matrix was used in place of this polymer matrix.

Barney teaches that concentrations as low as 0.1mM or 1E-4 mol/l are useful for creating films that do not exhibit detectable excitation with the naked eye, but are useful in conjunction with a photomultiplier. Therefore, it would be obvious to use such a concentration in a sol-gel derived glass as taught by Barney to produce similar results.

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6. Claims 5, 8-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barney in 2002/0110180 in view of Chan in his publication entitled "Luminescent quantum dots for multiplexed biological detection and imaging".

Barney teaches a temperature sensing composition that includes a matrix composition and semiconductor nanocrystals exhibiting fluorescence. It is stated that the quantum efficiency of the nanocrystals used can be greater than 20% and even greater than 80%. (see Paragraph 18). Barney goes on to state that the matrix in which the semiconductor nanocrystals are disposed can be an inorganic matrix such as a sol-gel derived matrix. (See paragraph 30). Barney then gives suitable precursors for such a matrix including hydrolysable compositions including silicon alkoxide (See Paragraph 32). In the claims it is noted that some language is drawn to product-by-process type limitations. These recitations are not limiting and do not offer patentable distinction in view of Barney, in that Barney creates a sol-gel glass through a different precursor. Regardless, the final product is the same and is in the form of a sol-gel glass.

Barney is silent as to the stability of his semiconductor nanoparticles in water for extended periods of time.

However, Chan teaches that quantum dots can be passivated and become nearly immune to the destructive effects of water on QY by including a protein capping layer on

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the QD surface. By doing this, Chan shows that it has been demonstrated that QD's can have nearly the same QY in water based environments as they do in solvents such as chloroform. By using such proteins, QD's become stable indefinitely in water based solutions. Chan teaches that such particles can have QY of 50% after a period of 2 years in a buffer solution (See Page 42, Column 2).

One of ordinary skill in the art would be highly motivated to import the teachings found in Chan to the teachings of Barney, since Barney teaches the production of sol-gel based structures, which obviously must undergo hydrolysis. The method of Barney includes the semiconductor nanocrystals (QD's) in the binder to disperse them throughout. Therefore, the nanoparticles should have the highest tolerance of water possible in order to retain their photoluminescent properties. Therefore, one of ordinary skill would be motivated to include a protein capping layer in order to make the particles more stable and become less affected by the hydrolysis process. Furthermore, upon incorporating the protein layer of Chan, the final product of Barney in view of Chan would inherently have the stability properties as delineated in Claims 5 and 9.

Regarding Claim 13: In conjunction with the previous discussion of Barney in view of Chan, Barney teaches that the matrix-semiconductor composite can be excited using a 480 nm wavelength excitor. Therefore the light emitting device system of Barney includes the matrix-nanocrystal composite, as well as a 480 nm source light. It can also further include a photomultiplier.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/
Supervisory Patent Examiner, Art Unit 1793

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